DOCUMENT RESUME

ED 161 197 EC 112 332

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TITLE Types of Private Speech Produced by Hyperactive and Non-Hyperactive Boys.
PUB DATE 78
NOTE 21p.; The document is part of the author's doctoral dissertation in clinical psychology at the American University
AVAILABLE FROM Anne P. Copeland, Department of Psychology, Kent State University, Kent, Ohio 44266

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS Cognitive Development; Elementary Education; Exceptional Child Research; *Hyperactivity; *Speech Communication; *Speech Skills; *Verbal Development

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ED161197

Types of Private Speech Produced by Hyperactive and Non-hyperactive Boys

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This paper is based on data collected as part of the author's doctoral dissertation in clinical psychology at The American University. The author would like to thank Dr. David Glenwick for his comments on an earlier draft of this manuscript, and Susan Cox, Gayle Wohlers, and Dorothy Kendall for their help in coding the videotapes. Requests for reprints should be sent to the author at Department of Psychology, Kent State University, Kent, Ohio 44266.

Running head: Private Speech and Hyperactivity

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Types of Private Speech Produced by Hyperactive and Non-hyperactive Boys

Abstract

Types and amount of private speech (aloud talking which is not addressed to another person) were assessed during the free play of 16 hyperactive and 16 non-hyperactive boys. Verbalizations were coded into 9 categories which denoted the boys' level of use of verbal control of his own behavior (Luria, 1961; Kohlberg, Yalger, and Hjertholm; 1968). Differences in amount and type of private speech between hyperactive and non-hyperactive boys were found which indicated that hyperactive boys may be presenting a specific or general cognitive lag in development. Treatment ramifications are discussed.

Types of Private Speech Produced by Hyperactive and Non-hyperactive Boys

The treatment of hyperactive children has become a common but varied goal of physicians, psychologists, and educators. Medical and behavioral interventions have been somewhat successful (Cantwell, 1975; Whalen & Henker, 1976), especially in addressing specific components of hyperactivity, e.g. attention span (Alabiso, 1972, 1975), academic achievement (Ayllon, Layman, & Kandel, 1975). A recent and increasingly utilized treatment for impulsive and hyperactive children involves teaching a new general strategy for problem solving by instructing the child to self-monitor, self-guide, and self-praise during tasks which usually elicit impulsivity (Meichenbaum & Goodman, 1971). In this self-instructional approach an adult first models the strategy then the child imitates, first aloud then progressively covertly.

This cognitive-behavioral approach was initially an outgrowth of the work by Luria (1959) in which he found that impulsive children had less verbal control over their own behavior than did other children. This finding was later supported by Meichenbaum and Goodman (1969) who reported that reflective children, as measured by Kagan's (1966) Matching Familiar Figures (MFF) test, demonstrated more verbal control of their motor behavior than did impulsive children. Other investigators have uncovered a similar relationship between impulsivity and lack of motor control on a motor inhibition task (Bates and Katz, 1970; Harrison & Nadelman, 1972; Constantini, Corsini, & Davis, 1973).

A developmental approach to the increased refinement of verbal control of behavior has been proposed by Luria (1961) and Vygotsky (1962). Verbal control first is most effective in initiating or disinhibiting simple gross behaviors. The next stage involves the ability of verbal statements

to inhibit or prevent some behavior. Last, verbal speech becomes useful in regulating or guiding complex behavior, both inhibiting and disinhibiting in an organized manner. This progression of function, however, has not been used in designing current cognitive-behavioral treatment approaches for impulsive children.

A somewhat separate but related schema that has, on the other hand, been instrumental in developing treatment programs involves a three-stage process regarding the gradual internalization of verbalizations (Luria, 1961; Meichenbaum & Goodman, 1971). In the first stage, adults model controlling verbalizations by telling the child what to do. In the second stage, the child imitates these controlling verbalizations, repeating them aloud himself. In the final stage, controlling verbalizations are produced internally by the child.

Many aspects of the use of these verbalizations, called "private speech" (aloud talking which is not addressed to another person), have been explored. For example, Klein (Note 1) studied the simultaneous changes in the audibility and the task-relevance of private speech, finding that as children mature, private speech becomes both less audible and more task-relevant. A useful focus on this developmental progression from talking by an adult to covert talking by a child has been developed by Kohlberg, Yaeger, and Hjertholm (1968). The lowest, most immature level in this hierarchy is characterized by presocial, self-stimulatory speech such as word play and repetition of words. The second level is called "outward-directed private speech" and includes remarks addressed to nonhuman objects and descriptions of the child's own activity. The third level, "inward-directed or self-guiding private speech," includes questions answered by the child himself and self-guiding comments. It is this level which is the

focus of self-instructional training. The fourth level, "external manifestations of inner speech" involves inaudible muttering and is indicative of the child's progression into Luria's third stage, where the child uses only internal verbal control. This "silent inner speech or thought" is, thus, the fifth and final level proposed by Kohlberg et al. (1968).

Unobtrusive observations of children playing or performing an assigned task have generally supported these theories about developmental changes in the use of verbal control (Kohlberg et al.,1968; Beaudichon, 1973; Klein, Note 1). In a naturalistic observation of nursery school children, Meichenbaum (Note 2) found differences between the types of verbalizations of impulsive and reflective children (as defined by the MFF). The impulsive children used more immature, self-stimulatory speech while the reflective children employed more mature, self-guiding speech, especially when specific problem tasks were assigned. Dickie (Note 3) found that impulsive and reflective children did not differ on their use of inner-directed speech but that impulsive children did use the more immature self-stimulating and outer-directed types of private speech more often than reflective children. Using a different population of problem children, Camp (Note 4) found that highly aggressive 6 - 8 year old boys did not use verbalizations in a way that effectively controlled their behavior. While not addressing the issue of function of verbal control, Peele and Routh (Note 5) found that children who vocalized more were children who had the most self-control, i.e. restricted their play per instructions.

Most of the research in this area, then, has focused on differences between impulsive and reflective children. The self-instructional treatment strategy, derived from this body of theory and research, though, has been

applied clinically with hyperactive children (Douglas, Parry, Marton, & Garson, 1976; Barkley, Copeland, & Sivage, Note 6). While impulsivity is one component of the group of symptoms comprising hyperactivity (Cantwell, 1975; Safer & Allen, 1976), other components such as activity level, distractibility, and attention span may make hyperactive children a different subgroup than impulsive children.

Because self-instructional treatment is based on the assumption that hyperactive children follow the same developmental progression of private speech as do impulsive children, it is important to discern whether this assumption is indeed a valid one. Differences in rate, sequence, or situation might be important factors to consider in developing treatment approaches which are maximally appropriate for each group. Although it is likely that impulsive and hyperactive children are similar in many respects, some differences between them have been noted. Campbell (1973), for example, found that hyperactive children made more comments on tasks and their own performance than either reflective or impulsive (not diagnosed as hyperactive) children. The present research addresses this issue by examining differences in the developmental progression of private speech between hyperactive and non-hyperactive boys.

Method

Subjects

Participants in this study were 16 boys diagnosed as hyperactive by a physician and by their teachers (scores greater than 1.5 on Conners' 1969 Teacher Questionnaire) and 16 boys who had never been referred for hyperactivity and were not rated as hyperactive by their teachers (Conners' scores less than or equal to 1.5). The hyperactive group had a mean

Conners' scale rating of 2.08 while the non-hyperactive group had a mean of 0.90. All boys were of at least average intelligence and were between the ages of 6 and 10. Boys in the hyperactive group had a mean age of 8.50 years (S.D. = 1.03); non-hyperactive boys had a mean age of 8.31 years (S.D. = 1.08), t = .51, N.S. No boy had taken any drug designed to alter his attention span, activity level, or other components of hyperactivity within the time required for the drug to be still active at the time of the study.

Procedure

Boys in this study also participated in a larger project (Copeland and Weissbrod, Note 7) examining modeling effects on hyperactive and non-hyperactive boys. Each boy played alone in a play room, then played again after viewing two modeling films. The data for the current study is taken only from the initial play period before the viewing of either film.

Each boy was brought individually into a novel play room equipped with a table, three chairs, four age-appropriate games, a microphone hanging from the ceiling, a one-way observation mirror, and the videotape equipment required for the modeling segment of the study. He was allowed to play for three minutes in the room alone with no instructions about activity. (A relatively short period as this has been found to be useful [Kohlberg et al., 1968] in providing information about verbalizations.) This play period was videotaped through the observation mirror.

Coding

Each boy's three-minute free play videotape segment was transcribed to facilitate the coding of the verbalizations. Two trained coders, blind to the design and purpose of the study, observed the segments and read

the transcriptions in order to place the verbalizations in context. Each verbalization (word, phrase, or sentence which was independent from the preceding and following one in meaning and/or time) was coded according to the following nine categories, chosen to accommodate these data and to specify parts of Kohlberg et al.'s (1968) strategy described above:

1. Exclamations -- words indicating excitement; usually single words, e.g. "Oh!," "Drats!," "Wow!"

2. Non-words -- singing or humming, whistling, vocal sounds accompanying motions, e.g. "hm-m-m," while pretending to make an airplane fly

3. Descriptions of self -- descriptions of boy's own behavior, e.g. "I'm listening," "I'm playing"

4. Descriptions of environment -- description of surroundings, including games, room, mirror, e.g. "There's some neat stuff here," "There's a new game "

5. Self-reinforcement -- self-praising statements with quality of positive feedback, not just an exclamation, e.g. "That's terrific," "Good!"

6. Planning -- statements of intention or commands if they precede action by greater than two seconds, e.g. "I'm gonna play that next," "I'll try and flip it in"

7. Commands -- instructions to self or planning statements that accompany action, e.g. "Try to get it in," "Find where it went"

8. Questions -- questions apparently addressed to self, e.g. "What are those?," "What should I do?"

9. Inaudible -- vocal sounds accompanied by lip movement which are too low in volume or intelligibility to be coded

Reliability, assessed by dividing the number of agreements by the total number of coded verbalizations, was established at .87. Each coder then rated half the boy's play segments.

Results

A 2 X 9 (Type of Boy X Category) analysis of variance with repeated measures on the 9-level factor was used to determine any differences in private speech (See Table 1). Post-hoc comparisons were made with the

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Insert Table 1 about here

Newman-Keuls' multiple range test. Means and standard deviations for each cell are presented in Table 2.

Insert Table 2 about here

There was a significant main effect for the Type of Boy factor, F (1, 30) = 5.14, p <.03, with hyperactive boys talking more (M = .85 verbalizations) than non-hyperactive ones (M = .30). A significant main Category effect was also found, F (8, 240) = 5.24, p <.001. All boys made more Exclamations (M = 1.16), p < .01, and Descriptions of Environment (M = 1.06), p<.01, than any other types of verbalizations.

Post-hoc examination of the significant Category X Type of Boy interaction, F (8, 240) = 2.97, p <.01, revealed that hyperactive boys used the Exclamations and Description of Environment categories more than did non-hyperactive boys (p <.01) and more than all other categories (p <.01). In addition, hyperactive boys made significantly more Descriptions of Themselves than Planning statements (p <.05). Non-hyperactive boys did not use any category significantly more than any other category. Means found in Table 2 show that Planning statements were among the least common

for both types of boys.

To facilitate interpretation and allow comparison across studies, the nine categories used in this study were collapsed into four levels corresponding to Kohlberg et al.'s (1968) first four levels. That is, Exclamations and Non-words made up Level I, presocial self-stimulatory speech. Level II, outward-directed private speech, consisted of the Description of Self and Description of Environment categories. The third Level, inward-directed or self-guiding private speech, was comprised of the Self-reinforcement, Planning, Questions, and Commands categories. The final Level IV, external manifestations of inner speech, consisted of the Inaudible category. Means for these collapsed levels are plotted in Figure I.

Insert Figure I about here

Discussion

That hyperactive boys talked more than non-hyperactive boys when alone in a playroom supports Campbell's (1973) finding that hyperactive children commented more about their play than impulsive and reflective children. It may be in contradiction with the work done by Meichenbaum (Note 2) in which he found no differences in the quantity of speech made by impulsive vs. reflective children. In addition, Peele and Routh (Note 5) found that self-controllers in an obedience task vocalized more than non-self-controllers, although age, task, and group differences between studies may have contributed to the discrepancies. These differences among studies may also suggest, however, that hyperactive and impuslive children should not be viewed as a single group or problem type for purposes of research on private speech. More research directly addressing the comparability of

"impulsive" children (chosen on MFF scores) and "hyperactive" children (chosen on a wider range of behavioral criteria) should be pursued before assuming that development of verbal behavior occurs at the same rate for both groups.

Most of the Category main effect appears to be accounted for by differences among categories used by hyperactive boys. That is, non-hyperactive boys did not differentially utilize any categories, while hyperactive boys employed Exclamations and Self- and Environment-Descriptions more than other categories. Figure I, the breakdown of the categories according to Kohlberg et al.'s (1968) schema, indicates that non-hyperactive boys do not appear to be demonstrating any between-category preference in "overt" private speech. It is indiscernable from these data, of course, whether they have stopped changing in category choice and have settled into a flat pattern or whether they are in the midst of development toward relatively more Level IV or even Level V statements. The hyperactive boys, on the other hand, show a definite pattern of using more Level II statements and relatively fewer Lever III and IV statements. That is, they appear to talk more than non-hyperactive boys but at a relatively less mature stage of development. The higher verbal output could be related to a generally higher behavior rate, as suggested by behavioral coding of the boys (Copeland and Weissbrod, Note 7). That the boys differed in their uses of categories, however, makes it unlikely that this totally accounts for the differences. Alternatively, the higher rate and the greater use of immature levels by the hyperactive boys may be partially due to an overall cognitive lag. A third possible interpretation of the differences found between these types of boys is that the hyperactive boys, rather than showing a general

lag in cognitive development, present a specific lag in the progression of private speech. Administering tasks of cognitive development such as Piagetian ones would confirm or disconfirm these interpretations while providing further information about cognitive abilities of hyperactive and impulsive children.

That the two types of boys in this study differed in levels of private speech is clear. Kohlberg et al.'s (1968) data with "normal" children suggest that only "muttering" and "self-guidance" verbalizations remained at a high rate by the age of 8½, the age of the boys in the present study. Other categories had dropped to a minimum rate, as was replicated here with the non-hyperactive boys. That non-hyperactive boys in this study used all categories, including the "inaudible" and "planning" ones, at a relatively low rate may be due to task differences or variability in age range, as compared to Kohlberg et al.'s (1968) study.

Two treatment issues are raised by the present data. First, it should be explored, as discussed above, whether differences between the types of boys were due to general activity rate differences or a specific or general cognitive lag. Once this has been determined, treatment would be differentially focused on decreasing overall behavior, increasing overall cognitive skills, or increasing the use of higher level private speech (as has been chosen by Meichenbaum and his colleagues). Strong rationale for choosing a self-instructional technique, then, would be supported if a specific lag in private speech were found. A second treatment issue which should be explored, as suggested though not specifically addressed by this study, is whether impulsive and hyperactive children develop private speech similarly. It may be that the MFF (used to label impulsivity) specifies cognitive impulsivity while teacher rating scales (used to label hyperactivity)

specify behavioral impulsivity. The two resulting groups of children may be very different in their optimal treatment strategies; it is important to explore these potential differences further before advocating similar self-instructional techniques as treatment. Last, the relationship of the developmental level of a child's spontaneously made private speech to the effectiveness of self-instructional treatment should be examined; perhaps the treatment approach will prove to be differentially effective for children using mature vs. immature levels of private speech.

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Table 1

Analysis of Variance of Type of Boy and Category Factors

Source	SS	df	MS	F
Between subjects	148.247	31	------	
Type of Boy (TB)	21.670	1	21.670	5.14*
Error	126.576	30	4.219	
Within subjects	212.222	256	------	
Category (c)	29.125	8	3.651	5.24***
TB X C	16.486	8	2.061	2.97**
Error	166.611	240	0.694	
Total	360.469	287	------	

*$p<.05$

**$p<.01$

***$p<.001$

Table 2

Means and Standard Deviations for Categories and Types of Boys

Category	Hyperactive		Non-hyperactive	
	X	SD	X	SD
Exclamations	1.750*	1.75	0.563	0.70
Non-words	0.438	0.61	0.313	0.46
Description of self	1.000	1.06	0.313	0.98
Description of environment	1.750	2.08	0.375	1.05
Self-reinforcement	0.250	0.43	0.313	0.98
Planning	0.125	0.33	0.188	0.53
Commands	0.813	1.24	0.188	0.73
Questions	0.750	1.20	0.125	0.33
Inaudible	0.750	0.97	0.313	0.77

*Mean number of occurrences of this category per three-minute interval

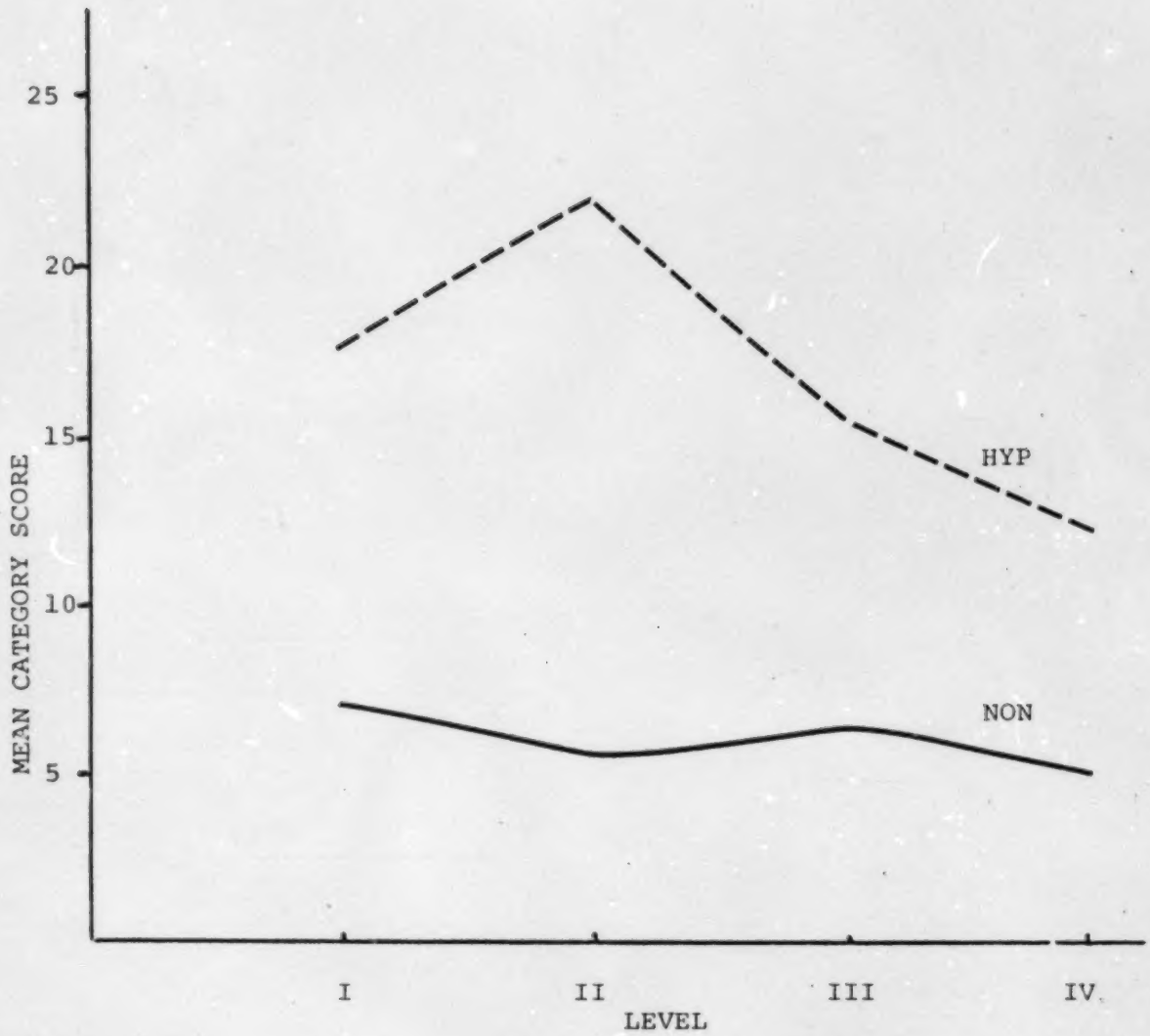
25
20
15
10
5
MEAN CATEGORY SCORE
HYP
NON
I
II
III
IV
LEVEL

Figure Captions

Figure 1 Mean frequency scores of vocalizations according to Kohlberg's four developmental levels